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ABSTRACT

Part 1 of this study is an exploratory look at the use of on-line services in academic libraries. For this study Lockheed and System Development Corporation (SDC) were contacted and each listed a number of libraries which used their services. Academic libraries using MEDLINE were contacted, under the assumption that they also used other systems. A survey was sent to 176 institutions of which 106 responded. Results of the survey showed that: (1) the Library Director is seen as the primary motivating force in the establishment of search services; (2) in some cases, the choice of a vendor was dictated by the fact that the vendor had a unique data base in an area appropriate to the interests of library users; (3) there are mixed views as to whether the user or an intermediary should access the IR systems; (4) the training programs offered by SDC and Lockheed were often not adequate; (5) the institutions readily accepted the concept of charging for on-line services, and (6) different operations of the library, such as document delivery and the increase of copying fiche materials, were affected by the use of on-line services. Recommendations were made that more attention be given to cost/ benefit analysis for this service. (Author/AP)

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On-Line Data Bases I. Use of Commercially Vended On-Line Data Bases by Academic Libraries

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A report to the Council
on Library Resources of
the 1974/75 Fellowship project

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The advances in on-line technology, the expansion of time-sharing networks and the advent of commercial vendors of bibliographic data bases -- primarily Lockheed and the System Development Corporation (SDC) -- are three factors which have influenced the growth in the number of institutions providing computerized retrieval services.

Prior to these events a frustrating dollar gap existed between innovation and application in computerized literature searching for all but a few academic libraries. Most libraries lacked the resources to lease and/or buy tapes of abstracting and indexing services and support campus computer operations necessary for searching of the tapes once acquired. One access route was available -- referral of users to existing computerized information centers or brokers (1,2,3,4,5).

Referral for information services presents difficulties. It requires that the inertia and lack of awareness of the potential user of a computerized search service be surmounted without a demonstration of product usefulness. Dammers (6) has suggested that an individual is unlikely to go beyond his own and local information resources for other than a small proportion of his information needs. A survey (7) of potential academic users of computerized bibliographic services in 10 northeastern states found a limited awareness of the existence and availability of relevant data bases among individual researchers and administrators. Badre et al. (8) surveying educators in the physical, biological and social sciences concluded that the majority are unaware of information center services.

Today, using on-line services, it is possible for any library to tap several million bibliographic citations in an interactive mode. The initial investment for equipment is minimal. The capabilities of the retrieval system can be demonstrated to potential users immediately.

With access to on-line data bases academic libraries can expand their traditional reference services by providing bibliographies tailored to the specific information needs of the requester. As part of a Council on Library Resources Fellowship Project I have taken an exploratory look at the use of these on-line services by academic libraries.

Identification of User Institutions

Lockheed and SDC were contacted in December 1973 to obtain a listing of academic libraries using their services. Although each of the firms supplied me with the names of several academic users, each also felt that commercial marketing considerations and client privacy rights made it inappropriate to release a complete listing of academic institutions. SDC also mentioned that they had submitted a proposal for NSF consideration (subsequently funded) concerning the impact of on-line systems in all types of libraries. This SDC study involved a lengthy questionnaire and a selected number of field interviews. Devising a questionnaire on a topic similar to SDC's appeared to be contraindicated, since it was likely that returns for each of the studies would suffer.

Identification of on-line users was accomplished by sending a brief letter to the Director of Libraries in academic institutions providing MEDLINE services. A tear sheet at the bottom of the letter asked that the Director indicate whether on-line services other than MEDLINE were available. If so, he was to check the data-bases used and indicate how long they had been used.

Surveying institutions providing MEDLINE service appeared to be an appropriate method to determine a number of on-line users. The institution would already have a terminal available for searching and librarians who

might recognize the potential utility of other on-line data bases. Two difficulties inherent in this method are recognized. Medical libraries are often administered through the School of Medicine and may operate independently of other academic library units; non-medical librarians may have had little exposure to on-line searching. Second, this inquiry was more likely to reveal SDC than Lockheed users. ORBIT, the search language for MEDLINE, was developed by SDC and is the language used for the SDC data bases. It is possible that a searcher familiar with the manipulation of ORBIT for MEDLINE would choose a commercial system with the same search language. Since it was not intended that this study compare the two commercial services this potential bias was acceptable. One hundred and twenty-six letters were sent (for institutions with multi-campus locations a letter was sent to the Director of Libraries at each campus). One hundred and six responses were returned.

Table I is a listing (Summer 1974) of some academic libraries providing in-house, on-line searching of data bases offered by Lockheed and SDC. This listing represents a compilation of results from this survey, personal contacts at meetings, Embry's (9) survey of ERIC services, and information received from Lockheed and SDC. Source of information is noted. Eight institutions surveyed, University of Arizona, University of Hawaii, University of Louisville, Tufts University, University of Nebraska (Lincoln), University of North Carolina, University of Cincinnati, and the University of Wisconsin (Milwaukee) anticipated providing on-line services in the Fall of 1974 or soon therafter.

TABLE I

ACADEMIC LIBRARIES
PROVIDING IN - HOUSE
SEARCHING OF ON - LINE DATA BASES

Institution	Length of time as a user[a]	Data Bases or Vendor(s)
Columbia University-Teachers College[b]	8 mo.	6
Dartmouth-Biomedical Library[c]	N.A.	15
Duke University-Medical Library[c]	N.A.	15
Governors State University[d]	N.A.	14
Harvard-Education Library[b]	5 mo.	6,12
Indiana University, Bloomington-Chemistry Library[e]	15 mo.	4-7,8
Kent State University[d]	N.A.	15
Michigan State University[b]	12 mo.	14,15
Penn State University[e]	9 mo.	3,6,12
Rutgers University[e]	1 mo.	3-5,7
Stanford University-Engineering Library[b]	6 mo.	5,9,10
Texas A&M University[d]	N.A.	14,15
University of California-Davis[e]	8 mo.	3,4
University of California-Santa Barbara[e]	6 mo.	1-12
University of Florida[e]	12 mo.	3-10
University of Kentucky-Medical Center Library[e]	9 mo.	3,4,6
University of Massachusetts-Medical Library[e]	6 mo.	3,6,8
University of Miami-Medical Library[e]	4 mo.	3-10
University of Michigan-Mental Health Research Library[b]	7 mo.	6,12
University of Minn., Duluth-Health Science Library[e]	9 mo.	3-8
University of Minnesota-Minneapolis[e]	12 mo.	4,6,11
University of Minnesota-Morris[e]	18 mo.	4,6
University of Nebraska-Medical Library[d]	N.A.	15
University of Nevada-Reno[e]	10 mo.	3,6
University of Pennsylvania[e]	6 mo.	3-12
University of Southern California-Medical Library[e]	6 mo.	4,6,11
University of Texas-Health Science Library[e]	3 mo.	3-8
University of Utah[e]	6 mo.	5,6,9
University of Washington[d]	N.A.	15
University of Wisconsin-Eau Chaire[e]	2 mo.	1,6
Wayne State University[c]	2 mo.	4,6,7
West Virginia University[e]	N.A.	6
Yale University-Science Library[c]	5 mo.	14,15

(Notes a-e, 1-15 on pg. 5)

a. As of Summer 1974
b. From Lockheed or SDC
c. Personal Contacts
d. Embry et al., Survey . . .
e. Survey of MEDLINE users

1. AIM/ARM
2. API
3. CAIN
4. CA Condensates
5. COMPENDEX
6. ERIC
7. GEOREF
8. INFORM
9. INSPEC
10. NTIS
11. PANDEX
12. PSYCH. ABSTRACTS
13. TRANSDEX
14. LOCKHEED
15. SDC

Interviews at User Institutions

Visits were made to 14 academic libraries using the commercially vended on-line services. Program initiation, choice of data base vendor, searcher training, publicity efforts, cost recovery, impact of the service on other library operations, and user reaction and evaluation were considered in these interviews. Results are reported as a series of responses to questions that might be raised by academic libraries considering implementation of these new information services.

FROM WHICH AREA OF THE LIBRARY STRUCTURE DOES THE INITIAL PROPOSAL TO TO PROVIDE COMPUTERIZED SEARCHES ORIGINATE?

Until recently automation activities in libraries have centered on technical service functions. I expected the original push for providing on-line data base services to originate in the reference staff since they were most likely to be aware of the possibility of applying automation to a public service function. This did not prove true for the institutions visited. In each library the initiation of on-line services was linked to a strong interest in, and awareness of, developments in machine-readable data bases at the administrative level. A member of the library administration, either the Library Director, the Director of Public Services, or an individual acting in the capacity of Systems Officer or Analyst, was seen as the primary motivating and implementing force in the establishment of computerized search services. This does not mean that no interest existed among reference

staff members. In several libraries the interest and awareness of the reference staff coincided with that of the administration. In a few cases it appeared that there was reluctance on the part of some reference staff members to participate in providing the new service. Concern was expressed that offering on-line searches would have a detrimental effect on time available for other reference functions.

WHAT FACTORS ARE CONSIDERED IN CHOOSING A DATA BASE VENDOR?

The decision to contract with either Lockheed or SDC for on-line access did not necessarily follow comparative deliberations on the merits of each company's systems. Initial choice of vendor appeared to be dependent upon a number of factors. Although Lockheed and SDC have a number of data bases in common, each company also offers some unique data bases. In some cases choice of vendor was dictated by the fact that the vendor had a unique data base in an area appropriate to the interests of the library's users.

Three institutions were approached by outside agencies (National Agricultural Library, National Institute of Education, Lockheed) to participate in an experimental offering of on-line searches of a particular data base. Use of the system was free during the trial period. One library had previously contracted with the Science Information Association for on-line services. In 1974 the Association terminated on-line activities; users were directed to SDC. Several libraries already familiar with ORBIT manipulation for MEDLINE contracted with SDC. In some cases the library administration was aware of the existence of only one of the vendors, either through promotional literature or contact with a company representative at a conference. A number of institutions starting with one vendor later initiated an additional contract with the other company when they became aware of its existence. Dual contracts such as these are sensible since neither company

charges for anything other than optional searching manuals or training sessions, and actual data base use.

WHO DOES THE SEARCHING?

Opinion has been divided in information retrieval circles as to who should access IR systems, the actual user of the citations or an intermediary (10,11,12). Support for direct use by the requester is based on the belief that the user's intimate knowledge of the subject field will be helpful in providing more effective search results. Whether this is actually true for available on-line data bases is debatable. If you consider that whoever does the searching must remain constantly aware of changes in the system that affect searching strategy -- it seems unlikely that such attention to detail will be exhibited by less than constant users.

None of the libraries visited reported more than a few isolated cases of a user interested in doing his own searching. Most users preferred to delegate the actual searching to an intermediary. Two libraries allowed user access to the system if the user expressed such an interest.

Searchers preferred either using the on-line systems with the user present, or they preferred to conduct the search at some later time after the requester had gone. Searchers preferring the user to be present when the search was done indicated that they felt this was the best method for exploiting the system's interactive capabilities. As citations are retrieved the user can indicate those that are relevant; this indication of relevance provides cues to the searcher for changing the initial strategy to retrieve similar relevant articles. Searchers choosing this method also felt the user better understood the capabilities and limitations of on-line systems if he were present during the search.

Other searchers felt more comfortable searching alone. In some cases the searcher wished to spend additional time after interviewing the requester to check reference sources or indexes to get a better understanding of the subject of the request. A number of searchers indicated that having the user present during the search encourages what might be called the "supermarket effect." The user views some of the initial citations, sees one that is relevant to another of his areas of interest, and wishes to sidetrack and explore the tangent further. This sidetracking may result in even another unrelated topic exploration. Such user behavior was particularly disturbing to searchers in libraries charging a fixed fee for a search of a particular data base. They were aware of dollars adding up with each minute exploring tangents at the terminal.

In most libraries members of the reference staff or subject librarians were acting as searchers. One library had a graduate student and some of the reference staff searching. In another library a member of the cataloging department as well as two reference staff members did the searching. Four libraries had the entire reference staff trained to provide searching. In three of these cases responsibility was divided along subject lines i.e. a searcher was responsible for one or more subject related data bases. This was the normal pattern for most libraries with more than one searcher. In the fourth library responsibility was divided by data base vendor; one individual was responsible for Lockheed searches, the other for SDC.

The Director of a medical library which had provided MEDLINE searches for some time, appointed one member of the reference staff to handle all data bases other than MEDLINE. This library was unique in its approach to staffing; the entire professional staff was involved in on-line searching (MEDLINE or other data bases). The Director indicated that this provided direct

knowledge of user interests and needs that was beneficial in acquisition and cataloging operations as well as in reference services.

HOW ARE SEARCHERS TRAINED?

Training experienced by the searchers ranged from do-it-yourself approaches, to participation in the training programs sponsored by Lockheed and SDC. Do-it-yourself training, incorporating reading the vendor manuals and experimenting with the system commands during real on-line searches, was the method used by some searchers who were already somewhat familiar with the construction of Boolean statements for MEDLINE and/or a batch mode current awareness service available to a number of the libraries visited. Where no previous familiarity with information retrieval systems existed, the usual training pattern followed was to send one or two of the individuals who would be involved in searching to a vendor sponsored training session. Upon return they would teach other staff members who would also be involved in searching.

Several searchers indicated that participation in either Lockheed or SDC's training sessions was adequate for the basics, but such programs did not provide the answers or experience for a number of questions concerning searching techniques which arose when working on-line with actual requests. This perceived inadequacy appeared to be linked with techniques for searching that could be considered to be time, and therefore money-saving methods.

The vendors are not completely unresponsive to this problem. Each publishes a newsletter which often includes tips on techniques for special searching problems. Each also provides users with a customer contact telephone number, and also encourages the sending of on-line messages while the searcher is at the terminal if some difficulty is encountered. However, several searchers indicated that response from Lockheed or SDC had been less than satisfactory for a number of cases in which they had called or sent

an on-line message. Unsatisfactory conditions included either no response at all or a delay of several weeks in receiving an answer.

Each of the vendors also sponsors advanced training sessions intended to allow participating searchers to become more familiar with specialized system techniques. The drawback here is that often these programs are offered out-of-state and cost an additional $100 for participation. Since in many cases on-line searching services are operating on a shoestring budget, costs for transportation, lodging and program fee appear prohibitive. Most searchers expressed a desire for the creation of some kind of work-shop program within their own state (perhaps sponsored by the state library) which would allow them to meet on a regular basis for mutual discussion of problems and solutions for on-line searching.

HOW HAVE ON-LINE SEARCH SERVICES BEEN PUBLICIZED?

Publicity efforts undertaken by libraries initiating on-line search services range from cautious restraint to all-out attempts to reach the widest possible audience of potential users.

Restraint in publicizing on-line searches was practiced in a few libraries in which a concern was expressed that the service might be too popular i.e. since no additional staff members were being added, the searching workload might become so heavy that other staff responsibilities would suffer. In several cases an initial policy of minimal publicity was seen as a method of providing searchers with adequate time to become comfortable in using the systems.

Some libraries appeared to be mired in a dollar dilemma in regard to publicity. On the one hand they desired a great number of users since it was intended that the service be self-sustaining. Charges for use would support terminal lease or purchase costs and any fixed monthly charges if a special

telephone line had been installed. On the other hand, the decision to make the service self-sustaining, with no provision for promotional funds, disallowed the possibility of extensive use of demonstrations to various campus groups as a publicity effort. For the most part these libraries relied on mailed notices to potential users or issued invitations to large group seminars in which the searcher would explain the system and give a limited demonstration of how the system worked for a sample search.

A few libraries promoted the service heavily. Efforts included several mailings detailing the advantages of on-line searching as a time-saver for faculty and students, asking a reporter from the campus news service to consider doing an article on the systems, placing ads in the campus newspaper, blanketing the campus with posters, and issuing invitations to small seminars geared to the specific interests of a particular group of faculty or students. In these seminars a number of searches would be conducted in response to actual subject requests from audience members. Two libraries initiated on-line services with an intentionally low flat rate, hoping to increase word-of-mouth publicity by satisfied users.

In one institution a successful effort was made to include information about on-line searches in a guideline publication issued by the Office of Research Administration. The information in this publication, aimed at faculty writing research proposals, indicated that fees for on-line searches were legitimate items for inclusion in proposal budgets.

HOW ARE ON-LINE SERVICES FINANCED?

Contrary to DeGennaro's (13) belief that " Most librarians can be expected to be opposed to the concept of pay libraries or user charges...as

a matter of principle..." librarians in the institutions visited readily accepted the concept of charging for on-line searches. Perspectives on how much of the costs associated with on-line searching should be borne by the user varied.

Five libraries provided free searches when they initiated the service. Three of these libraries were cooperating with an outside agency and could provide free searches during the experimental period. One library Director viewed the provision of a limited number of free searches as a way of assuring a grace period for the searcher to become competent in system use. One small special library had no defined budget for searching; the parent institution considered the costs to be normal operating expenses for the library in serving its specialized clientele. All four of the other libraries had initiated charging systems,or anticipated doing so in the near future when I visited them.

Several libraries chose to introduce the search services at a purposely low rate ($5-$10). This served a number of objectives. The relatively low charges could be viewed as a publicity expense. Satisfied users would initiate the "grapevine" effect so often mentioned as the most productive method for bringing in new people for searches. The difference between the $5 to $10 charge and actual costs incurred was also viewed as a training expense; as searchers became more familiar with the data bases it was expected that their search time would decrease. Initiating the service at a low fixed rate allowed future estimates for pricing of searches to be based on real experience and knowledge of costs, rather than trying to pre-guess what would happen.

Two patterns emerge as representative of fee systems ultimately adopted by most of the libraries. In the first the user bears only direct costs associated with the search-- on-line costs as billed by the vendor, Tymshare

costs, and off-line printing costs.

The second pattern is more complex; the user bears some or all of the additional costs associated with the on-line service. In addition to on-line time, Tymshare, and citation costs some libraries have developed fee schedules which include anywhere from one to all of the following considerations: purchase or lease costs for the terminal, cost of telephone installation and monthly service charge, long-distance charges for reaching a Tymshare node, searcher's time, clerical time, supplies, and postage. This fee may be applied on a minute by minute use basis, or by the development of a flat fee by which the user is charged for blocks of time (perhaps 30 minutes) and a certain number of citations (perhaps 100). If the search requires fewer than 30 minutes and results in fewer than 100 citations the user still pays the flat rate.

Perhaps the most controversial item included in some fee schedules is the charge for searcher time spent in interviewing, on-line searching, and editing. Libraries which do not include searcher time in their fee schedule appear to consider time devoted to on-line activities to be the same as time devoted to any other reference function. Since fees are not charged for the librarian's time spent in carrying out traditional reference services, charging for the new service is considered inappropriate.

For a number of libraries which do include searcher time in charges for on-line searching, this activity is considered to be an "extra" service. They are interested in providing the service, but interest is not great enough to make trade-offs in services already provided. The new service is viewed as one which should be self-sustaining, with charges adequate for covering additional personnel that may be needed if the volume of search requests increases.

Searchers interviewed felt most comfortable in a situation in which the searching activity was viewed as a normal service function i.e. the user was not charged for the searcher's time. A number of searchers indicated that charging for their time had an inhibiting effect on their willingness to explore the problem to any depth during the interview, or to consult additional reference sources for further clarification of the question. In addition, as beginning searchers they felt particularly uncomfortable about their inexperience with the systems-- inexperience which would be charged to the user if it resulted in increased interviewing time or terminal time. Two libraries have felt it necessary to require the requester's signature on the request form after a clause in which the user agrees to pay the charges " regardless of search results" .

Whatever the pricing structure used by a library, all searchers indicated that they were extremely aware of dollars mounting up as they conducted their on-line searches.

WHAT IMPACT HAS THE INTRODUCTION OF ON-LINE SERVICES HAD ON OTHER LIBRARY OPERATIONS?

Perhaps it is too early to consider the real impact that on-line searching might have on library operations; most libraries have provided the service for less than a year.

One of the areas that might be affected by the introduction of such services is document delivery -- providing the user with the materials cited in the bibliography. Libraries visited had not specifically studied any changes occuring in interlibrary loan volume after the service was introduced; several individuals indicated that their collections were likely to be sufficient for needs generated by searches. One library had developed a particularly good program to explain how to obtain the materials cited in the user's search.

Each search sent included a key to abbreviations used in the citations and a sample citation which highlighted author, title, etc. information. A short paragraph explained how articles and reports could be obtained. An NTIS order form accompanied all searches of this particular data base.

Following the introduction of free ERIC searches one library noted a 200% increase in copying of fiche materials from the report collection. Other libraries reported increased copy machine use after the introduction of on-line searches.

In one library, staff reorganization followed provision of on-line services. Greater use of the clerical staff was made in staffing the reference desk; reference librarians served in a back-up capacity for unresolved questions. This reorganization allowed reference librarians more time for conducting seminars demonstrating the search services, and additional time for interviewing, searching and editing operations.

Three libraries routinely used the on-line systems as reference sources for questions received at the reference desk as well as for the compilation of bibliographies. One individual mentioned that an author search of the ERIC data base often proved to be the quickest way to find locational information about an individual.

WHAT PERFORMANCE MEASURES ARE BEING APPLIED TO THE NEW SERVICE?

Most libraries had not yet developed a formal evaluation program. Several individuals questioned the need for attempting such a program; they felt that repeat users and verbal expressions of user satisfaction were sufficient indicators of an effective service. A number of libraries

planned to develop a user survey in the near future. None of the libraries anticipated an evaluation program that would include precision and recall determinations for individual searches-- two traditional measures which have been applied to information retrieval services.

The library which provided free ERIC searches over a six month period (757 searches),devised a user questionnaire for which 103 responses were received. Users indicated that searches had saved them from 1 to 200 hours of searching time. Median searching time saved was 16 hours. Seventy-nine users indicated that they would be willing to pay for ERIC searches. The amount they were willing to pay ranged from $1 to $30. The median amount willing to pay was $5.

Another library, searching the CAIN data base, sent an evaluation form with each search that asked the requester to indicate how many of the citations received were pertinent, interesting, or not useful. Eighty-seven evaluations were returned. Users indicated that 61% (6322) of the citations were pertinent, or interesting even if not directly pertinent.

Informal checks on search strategy occur to the extent that individual searchers feel the need to consult with other searchers in the library on a difficult question." One library had weekly rehash sessions where various strategies that might have been used for particularly difficult questions received during the week were discussed by all the searchers.

Conclusion

On-line searching is a new service option in an embryonic stage of development. Even though initiating this service requires a much smaller financial

investment than could previously be contemplated in considering batch operated information retrieval services, funding the operation appears to be an obstacle for a number of libraries. This is particularly true when the service is viewed as an "extra" service tacked on to other existing services.

If on-line searching is to have a chance to be considered a "proper" service for a number of academic libraries, it appears that more attention must be given to cost/benefit analyses for this service. In addition, more information is needed concerning costs and benefits of existing services. Cost/benefit analyses of this type might lead to a reassessment of priorities in academic libraries.

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